Supporting Information

Polydopamine Nanocapsule: A Theranostic Agent for Photoacoustic Imaging and Chemo-Photothermal Synergistic Therapy

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Experimental section

Calculation of the photothermal conversion efficiency.

The photothermal conversion efficiency (η) of PDAC and PDAP was determined and calculated according to a published method[1]. In detail,

$$\eta = \frac{hA\Delta T_{\max} - Q_s}{I(1-10^{-A_\lambda})} \quad (1)$$

in which *ΔTmax* is the temperature elevation at the maximum steady-state temperature, Qs is the heat associated with the light absorbance of the solvent, which is measured independently to be 17.4 mW, I is the laser power, which is 2 W/cm^2, A_λ is the absorbance of PDA samples at the wavelength of 808 nm. And *h*A can be measured by applying the linear time data from the cooling period vs –lnθ (Figure S2. A,B).

Synthesis of polydopamine nanoparticles (PDAP). PDAP was prepared according to a published method.[2] Briefly, 4 mL $NH_3 \cdot H_2O$ was added into the mixture of 40mL ethanol and 90mL ultrapure water at the temperature of 30，after stirring for 30minutes, 10mL dopamine solution(0.3g) was added to the reaction system and further reacted for 24h. The final PDA nanoparticle was collected by several centrifugations.

Characterization of PDAP. The morphology and size of PDAP was characterized by using a scanning electron microscope (SEM, SU-70). Ultraviolet-visible

spectrophotometer (UV-1750) was performed to record the absorbance of different concentrations of PDAP. The photothermal heating curves was plotted by the same method PDAC used. The photothermal conversion efficiency (η) was also measured.

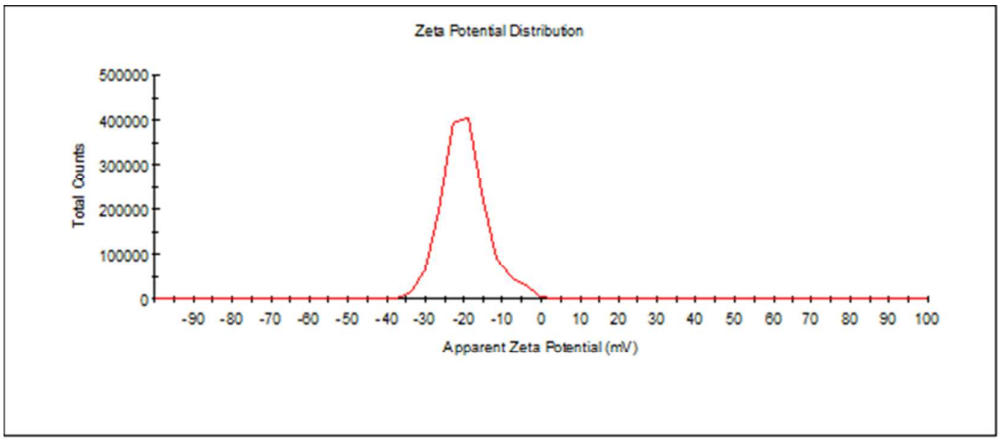

Figure S1. Zeta potential of PDAC samples in water.

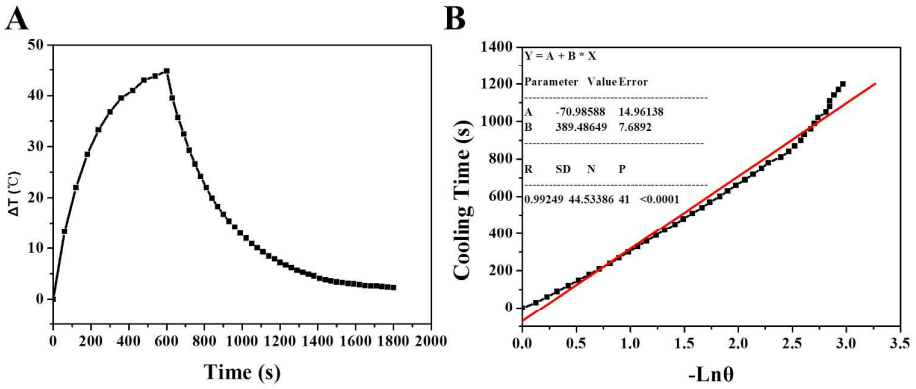

Figure S2. A) The photothermal response of the aqueous dispersion of PDAC for 480 s with an NIR laser (808 nm, 2 W /cm^2) and then the laser was shut off. B) Linear time data versus -lnθ obtained from the cooling period of FigureS.2A.

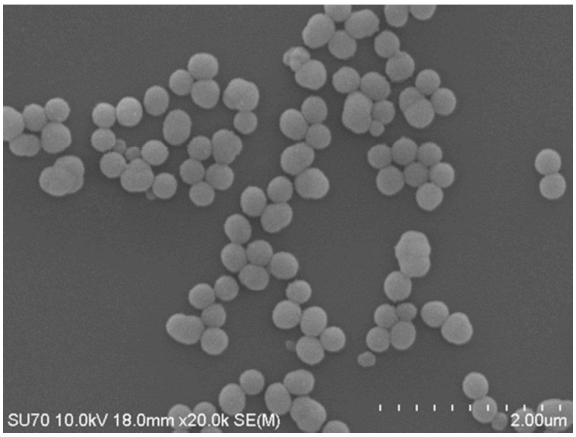

Figure S3. SEM image of PDA particles (PDAP), the scale bar is 2μm.

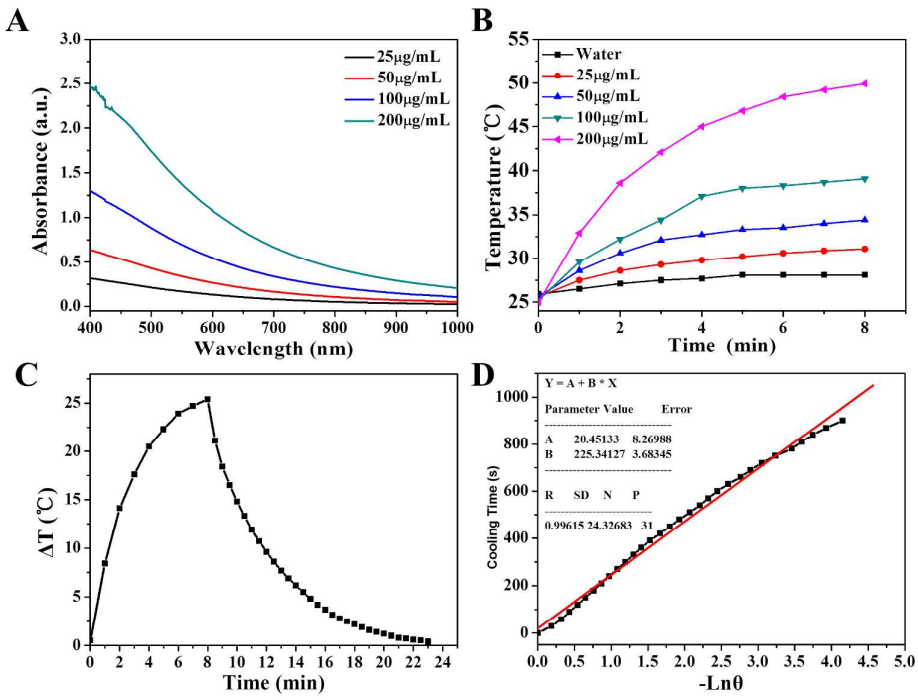

Figure S3. A) The UV-Vis absorbance and B) Photothermal heating curves of different concentrations of PDAP. C) The photothermal response of the aqueous dispersion of PDAP for 480 s with an NIR laser (808 nm, 2 W /cm^2) and then the laser was shut off. D) Linear time data versus -lnθ obtained from the cooling period of Figure S3.C.

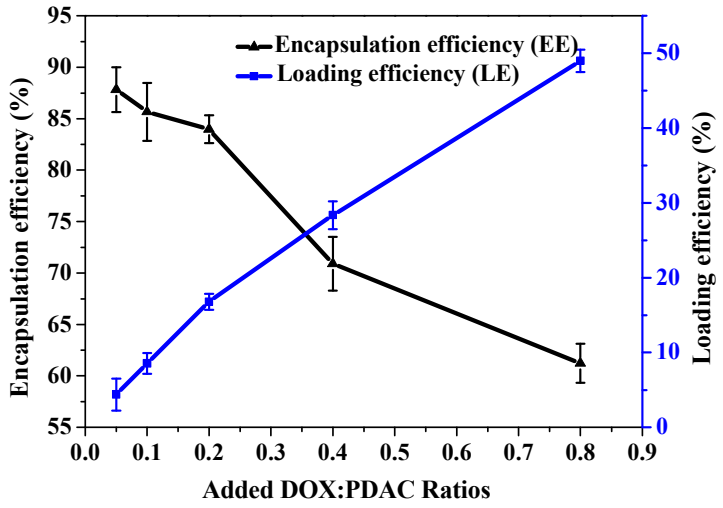

Figure S4. DOX encapsulation and loading efficiency with different concentrations of DOX.

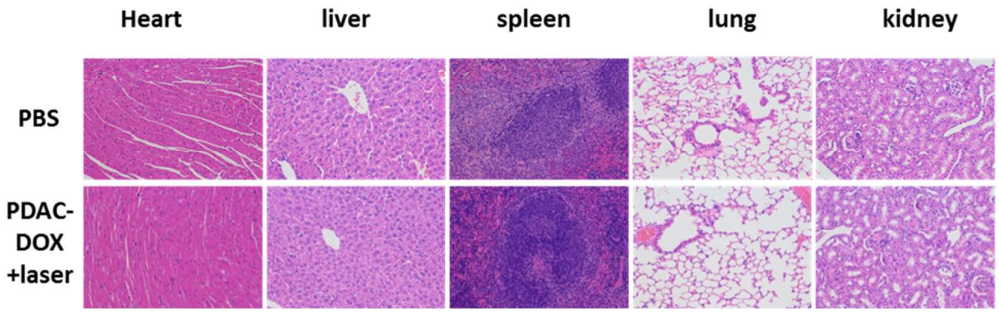

Figure S5. The H&E-stained slices of major organs in PBS and PDAC-DOX group.

REFERENCES

(1) Roper, D. K.; Ahn, W.; Hoepfner, M., Microscale Heat Transfer Transduced by Surface Plasmon Resonant Gold Nanoparticles. *Journal of Physical Chemistry C Nanomaterials & Interfaces* **2015,** *111* (9), 3636.

(2) Liu, Y.; Ai, K.; Liu, J.; Deng, M.; He, Y.; Lu, L., Dopamine-melanin colloidal nanospheres: an efficient near-infrared photothermal therapeutic agent for in vivo cancer therapy. *Adv. Mater.* **2013,** *25* (9), 1353-1359.